

REMARKS

The objections to Claims 1 and 8 have been obviated by replacing the word “thereinside” with “inside”.

The rejection of claims 1-5, 8-12 and 15-20 under 35 USC §102(e) and claims 6-7 and 13-14 under §103 has been obviated by revising independent claims 1, 11 and 18 to more clearly distinguish the invention from the prior art of record. However, before the revisions of the claims are discussed, a brief recap of the principal features and advantages of the method of the invention will be given so that the language used in the amendment may be more fully appreciated.

Generally speaking, the invention is an improved process for fabricating a wooden member for use in a steering wheel. As is pointed out in the “Background” section of the application, in the processes used previously, a wooden member having a rectangular cross section was first softened and curved and then compressed to provide a steering wheel section having a rounded cross section. While such a method was operative to form such wooden steering wheel sections, applicant observed that such steering wheel sections were prone to discoloration and cracking during the compression step, and moisture absorption and consequent shape deformation after the compression step.

Applicant surprisingly discovered that not only the discoloration problem was caused by the high compression ratios of the wooden members at their corner portions, but that the shape deformation and cracking problems were also caused by these high compression ratios. Accordingly, applicant proceeded to chamfer the corners of the wooden member prior to the compression step to lower the compression ratio in the corner regions. Applicant further surprisingly discovered that the cracking problems could be eliminated if the chamfering was such that in cross-section, a thickness dimension of a largest portion is at most 1.85 times a thickness dimension of a smallest portion. Finally, the applicant also discovered that when the angles of the obtuse angles that are formed by the chamfering are between 120° and 150°, it is possible to provide, by extremely simple processing, a more stable shape after processing and more uniform color tone.

The claims have been amended to more specifically recite the aforementioned features of the method which result in the advantages of the invention. Claim 1 now recites a wooden member fabrication method comprising the sequential steps of: providing a wooden member original with a substantially rectangular cross-section, having corner portions; chamfering said corner portions of the wooden member such that said wooden member has a polygonal cross-section; and compression-deforming the wooden member original in directions toward a center of the cross-section in order to provide an outer periphery of the wooden member original with an arcuate surface.

None of the references of record either discloses or suggests the method defined in method claim 1. In particular, the Mori '100 patent neither discloses nor suggests a single one of the limitations of claim 1. In particular, all that this reference discloses with respect to fabrication of wooden steering wheel pieces 42 and 44 is that these pieces are "carved from pure wooden material" and "special processed" "into a shape of a curved stick which is arcuate along inner and outer peripheries of the rim portion 14." (See column 5, lines 25-31 and 44-48.) There is no disclosure whatever of any of the sequential method steps of (1) providing a wooden member original with a substantially rectangular cross-section, (2) chamfering said corner portions of the wooden member such that said wooden member has a polygonal cross-section for avoiding breakage of the wooden member during a compression deforming step and (3) compression-deforming the wooden member original in directions toward a center of the cross-section in order to provide an outer periphery of the wooden member original with an arcuate surface. In making her rejection, the Examiner points to the completed steering wheel of Figure 3 in the Mori '100 patent and equates the flat sections on the top and bottom of the illustrated cross-section to the recited chamfered portions. However, the Figure 3 cross-sectional drawing of the Mori steering wheel clearly does not disclose the positively recited step of chamfering said corner portions of the wooden member such that said wooden member has a polygonal cross-section prior to a step of compression-deforming the wooden member original in directions toward a center of the cross-section in order to provide an outer periphery of the wooden member original with an arcuate surface. Hence claim 1 is clearly not anticipated by amended claim 1 under 35 USC §102(e).

Nor is amended claim 1 in any way rendered “obvious” by the Mori ‘100 patent, as there is no teaching or remote suggestion in this reference of (1) the problem caused by the compression of corner portions of curved wooden members having rectangular cross-sections into curved wooden members having arcuate cross-section, or (2) the solution afforded by the chamfering of the corner portions of the wooden members, or (3) the specifically recited function of the chamfering step of avoiding breakage of the wooden member during a compression deforming step. Hence amended claim 1 is clearly patentable over the Mori ‘100 patent.

Claims 2-5 are patentable at least by reason of their dependency on amended claim 1.

Claim 6 is patentable not only for its dependency on claim 1, but for its recitation of a range of angles that are important, if not critical to the proper function of the chamfering step.

Claim 7 is patentable not only for its dependency on claim 1, but for its recitation that the chamfering step results in a thickness dimension of a largest portion is at most 1.85 times a thickness dimension of a smallest portion. In the last Office Action, the Examiner stated that the applicant had established no criticality with respect to this limitation. The applicant respectfully disagrees. Page 5, paragraph 3 of the specification clearly states:

When the dimension of the thickest portion is not more than 1.85 times the dimension of the thinnest portion, cracking of the wooden member original at a time of compression can be prevented. That is, if this ratio exceeds 1.85 times, when the thickest portion and the like are compressed, locations at which the largest forces are applied are the thinnest portions, and cracking is likely to occur at these locations. However, when this ratio is 1.85 times or less in the present invention, this can be avoided.

Thus claim 7 is clearly patentable over the art of record.

Claims 8-10 are patentable at least by reason of their dependency on amended claim 1.

Claim 11 is patentable for all the reasons given with respect to claims 1 and 7.

Claims 12 and 13 are patentable at least by reason of their dependency on amended claim 11.

Claim 14 has been cancelled, since it has been substantially incorporated into claim 11.

Claims 15-17 are patentable at least by reason of their dependency on amended claim 11.

Claim 18 is patentable for all the reasons given with respect to claims 1, 6 and 7.

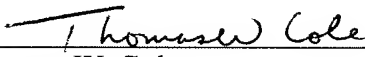
Claim 19 has been cancelled, since the limitation therein has been incorporated into claim 18.

Finally, claim 20 is patentable at least by reason of its dependency on amended claim 11.

Now that all of the claims are believed to be allowable, the prompt issuance of a Notice of Allowability is hereby earnestly solicited.

Respectfully submitted,

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